

## **ABSTRACT OF THE DISCLOSURE**

The invention relates to double-stranded nucleic acid fragments comprising a chemically modified backbone and at least 4-1000 bp, preferably 8-500 bp, and most preferably 16-200 bp. The disclosed molecules (DRIL molecules) may interfere with DNA damage signalling and repair pathways, in particular the non homologous NHEJ pathway of double-stranded break repair. The invention discloses the application of the DRIL molecules as adjuvant compositions to be used in association with a DNA breaking treatment, particularly radiotherapy or chemotherapy, in combination with a pharmaceutically acceptable carrier, in an efficient amount to be introduced in the tumoral cell nuclei in order to trigger DNA repair induced lethality (DRIL in short) of tumoral cells/tissues.